What's New in @RISK 4.5

Overview

@RISK 4.5 brings a set of new analyses and new options to allow easier modeling and more in-depth studies on @RISK 4.0 models. New enhancements include:

- **Three New Advanced Analyses** - **Advanced Sensitivity Analysis**, **Stress Analysis**, and **Goal Seek** (@RISK Professional and Industrial only)
- **Alternate Parameters for Probability Distributions**, allowing the entry of percentile parameters as arguments to many input probability distributions. These alternate parameters are available in both the pop-up Define Distribution window or in distribution functions in Excel.
- **Cumulative Descending Percentiles**, where percentile probabilities can be optionally reported as cumulative descending values as well as cumulative ascending values. Alternate percentile parameters for probability distributions can also be entered as cumulative descending percentiles.
- **Quick Reports** - single one page reports in Excel containing statistics and graphs for a simulation result, formatted for printing.
- **Enhanced Define Distribution window**, with point and click selection of references from Excel, a pop-up distribution palette for selecting distributions, a new right-click menu and other enhancements.
- **Improved Error Reporting** during simulation, where the **Pause On Error** option now identifies the output(s) with errors and the cells in your model that caused the error for each.

The RISK45 directory on your system contains **multi-media tutorials** that illustrate the new capabilities of @RISK 4.5. These tutorials require a media player capable of running .WMV files and a PC with audio.

Description of New Features

Advanced Analyses

The Advanced Analyses include **Advanced Sensitivity Analysis**, **Stress Analysis**, and **Goal Seek**. Each of these uses @RISK's multiple simulation capability to analyze a simulation model.

- **Goal Seek** allows you to find a specific simulated statistic for a cell (for example, the mean or standard deviation) by adjusting the value of another cell.
- **Stress Analysis** allows you to analyze the effects of stressing @RISK distributions. Stressing a distribution restricts samples drawn from the distribution to values between a specified pair of percentiles or samples a new “stress” distribution instead of the original distribution in your model.
- **Advanced Sensitivity Analysis** allows you to determine the effects of inputs on @RISK outputs. An input can be either an @RISK distribution or a cell in your Excel workbook. Advanced Sensitivity Analysis runs a full simulation at each of a set of possible values for an input, tracking the simulation results at each value.

Each of these analyses has its own dialogs and generates a set of pre-formatted reports and graphs in Excel.

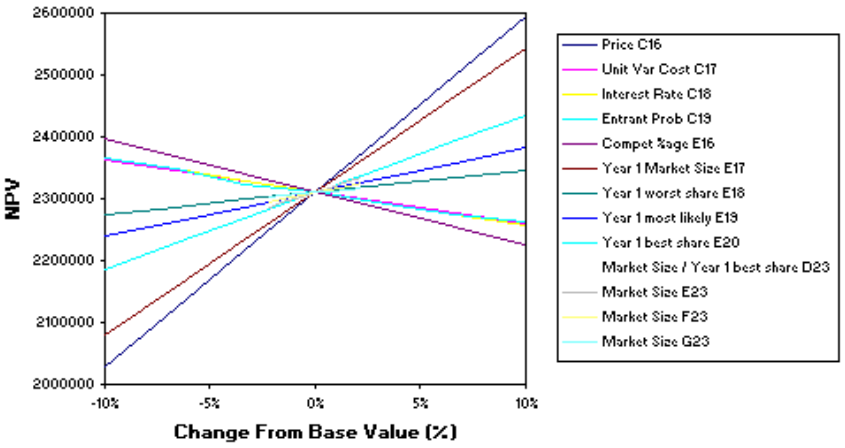
Advanced Analysis Report in Excel

Advanced Sensitivity Analysis Summary

This report summarizes changes to the simulated distribution for NPV caused by stepping through 14 inputs. Each input is stepped through several values, and a full simulation was run at each value. A total of 98 simulations were completed

Summary Information	
Output Name	NPV
Output Reference	C32

Inputs Ranked by Mean				Output			
Name	**Book**	**Analysis**	**Value**	**Mean**	**Min**	**Max**	**StdDev**
Price	Hippo.xls	Base +10.00%	2.420000052	$2,592,883	$308,523	$4,677,739	$702,035
Year 1 Market Si	Hippo.xls	Base +10.00%	1100000	$2,541,539	$890,538	$4,585,169	$688,192
Price	Hippo.xls	Base +6.67%	2.346666725	$2,438,752	$875,546	$4,507,978	$676,606
Year 1 Market Si	Hippo.xls	Base +6.67%	1066666.67	$2,464,522	$863,552	$4,446,225	$667,337
Year 1 best shar	Hippo.xls	Base +10.00%	0.769999987	$2,434,887	$810,881	$4,524,860	$704,663
Price	Hippo.xls	Base +3.33%	2.273333397	$2,404,621	$842,563	$4,338,157	$651,117
Compet %age	Hippo.xls	Base -10.00%	0.180000003	$2,396,230	$880,733	$4,201,606	$630,811
Year 1 best shar	Hippo.xls	Base +6.67%	0.746666656	$2,393,418	$810,457	$4,405,891	$678,034
Year 1 Market Si	Hippo.xls	Base +3.33%	1033333.34	$2,387,506	$836,566	$4,307,280	$646,483
Year 1 most likel	Hippo.xls	Base +10.00%	0.440000007	$2,381,934	$811,414	$4,216,901	$628,490



Alternate Parameters for Probability Distributions

@RISK 4.5 allows the entry of percentile parameters as arguments to many input probability distributions. This allows you to specify values for specific percentile locations of an input distribution as opposed to the traditional arguments used by the distribution. For example, the distribution:

RiskNormal(100,20) – specifying a normal distribution with a mean of 100 and a standard deviation of 20

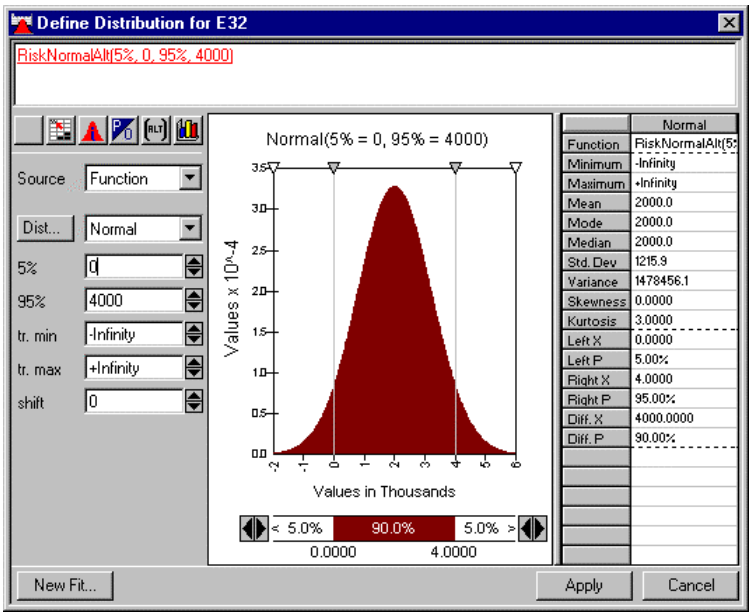
could also be entered as:

RiskNormalAlt(5%, 67.10, 95%, 132.89) - specifying a normal distribution with the 5th percentile at the value of 67.10 and the 95th percentile at the value of 132.89.

Percentiles may also be mixed with the standard distribution arguments, such as:

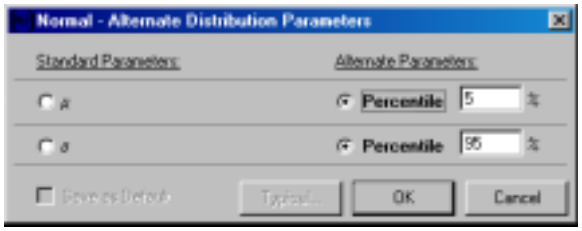
RiskNormalAlt("mu", 100, 95%, 132.89) - specifying a normal distribution with a mean of 100 and the 95th percentile at the value of 132.89.

These alternate parameter functions may be entered directly in your spreadsheet as with other @RISK distribution functions, or in the Define Distribution window:



The ALT icon

Clicking the ALT icon allows you to switch from standard distribution arguments to alternate percentile arguments:



A set of percentile arguments may be set as the default for a given distribution type, so that every lognormal distribution, for example, will be entered using a 10th and 90th percentile value.

Sampling Distributions with Alternate Parameters

During a simulation @RISK calculates the appropriate distribution whose percentile values equal those alternate parameter values entered and then samples that distribution. Just like all @RISK functions, the entered arguments may be references to other cells or formulas, and argument values may change iteration to iteration during a simulation.

For more information on the @RISK distributions that are available using alternate parameters, see the **Reference: @RISK Functions** chapter of this manual, or check the list shown when the class of functions titled **@RISK Distrib (Alt Params)** is shown in the Function Wizard in Excel.

Cumulative Descending Percentiles

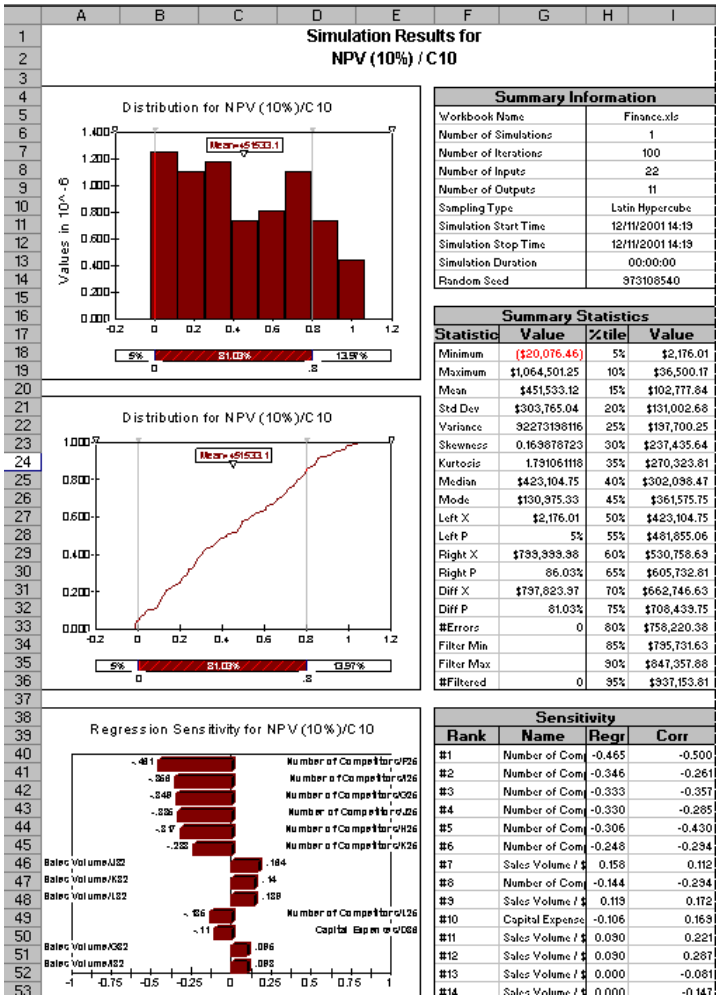
@RISK 4.5 can report percentile probabilities as cumulative descending values as well as cumulative ascending values. This option causes reports to display percentiles as the probability of obtaining a value above a given threshold. The display of cumulative descending percentiles is selected on the @RISK add-in menu **Options** command.

Cumulative descending percentiles may also be used in specifying alternate percentile parameters for probability distributions. In addition, arguments to the RiskCumul probability distribution may be entered using descending probabilities. A new set of @RISK functions allow the entry of these cumulative descending values. Each of these functions has a "D" after the function name, such as **RiskCumulD**, **RiskNormalAltD**, etc. For more information on using these functions, see the **Reference: @RISK Functions** chapter of this manual.

Quick Reports

Quick Reports are single one page reports in Excel containing statistics and graphs for a simulation result.

Quick reports can be generated by simply right clicking on a graph in the @RISK Results Window and selecting **Quick Report,** or through the @RISK **Report Settings** dialog. Using the Settings dialog, you may also choose to automatically generate Quick Reports for each output in your model at the end of a simulation.



Simulation Results for
NPV (10%) / C10

Distribution for NPV (10%)/C10

Values in 10^-6

Distribution for NPV (10%)/C10

Regression Sensitivity for NPV (10%)/C10

Summary Information	
Workbook Name	Finance.xls
Number of Simulations	1
Number of Iterations	100
Number of Inputs	22
Number of Outputs	11
Sampling Type	Latin Hypercube
Simulation Start Time	12/11/2001 14:19
Simulation Stop Time	12/11/2001 14:19
Simulation Duration	00:00:00
Random Seed	373108540

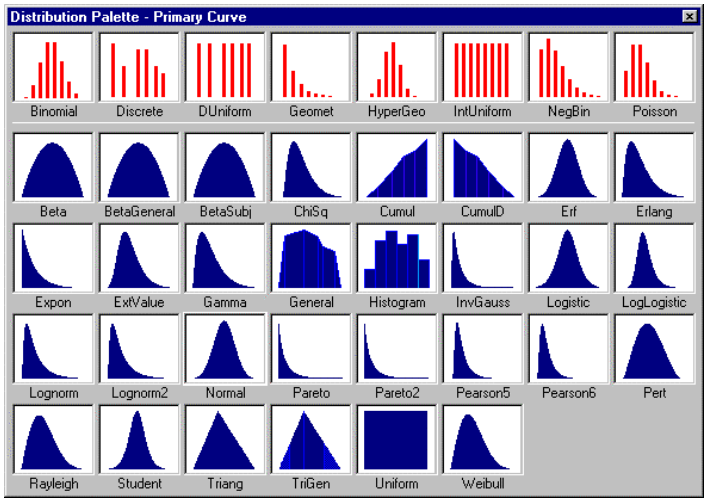
Summary Statistics			
Statistic	Value	%tile	Value
Minimum	($20,076.46)	5%	$2,176.01
Maximum	$1,064,501.25	10%	$36,500.17
Mean	$451,533.12	15%	$102,777.84
Std Dev	$303,765.04	20%	$131,002.68
Variance	92273136116	25%	$197,700.25
Skewness	0.169878723	30%	$237,435.64
Kurtosis	1.731061118	35%	$270,323.81
Median	$423,104.75	40%	$302,098.47
Mode	$130,975.33	45%	$361,575.75
Left X	$2,176.01	50%	$423,104.75
Left P	5%	55%	$481,855.06
Right X	$793,393.98	60%	$530,758.69
Right P	86.03%	65%	$605,732.81
Diff X	$797,823.97	70%	$662,746.63
Diff P	81.03%	75%	$708,433.75
#Errors	0	80%	$758,220.38
Filter Min		85%	$795,731.63
Filter Max		90%	$847,357.88
#Filtered	0	95%	$937,153.81

Sensitivity			
Rank	Name	Regr	Corr
#1	Number of Comp	-0.465	-0.500
#2	Number of Comp	-0.346	-0.261
#3	Number of Comp	-0.333	-0.357
#4	Number of Comp	-0.330	-0.285
#5	Number of Comp	-0.306	-0.430
#6	Number of Comp	-0.248	-0.294
#7	Sales Volume / $	0.158	0.112
#8	Number of Comp	-0.144	-0.294
#9	Sales Volume / $	0.119	0.172
#10	Capital Expense	-0.106	0.169
#11	Sales Volume / $	0.090	0.221
#12	Sales Volume / $	0.090	0.287
#13	Sales Volume / $	0.000	-0.081
#14	Sales Volume / $	0.000	-0.147

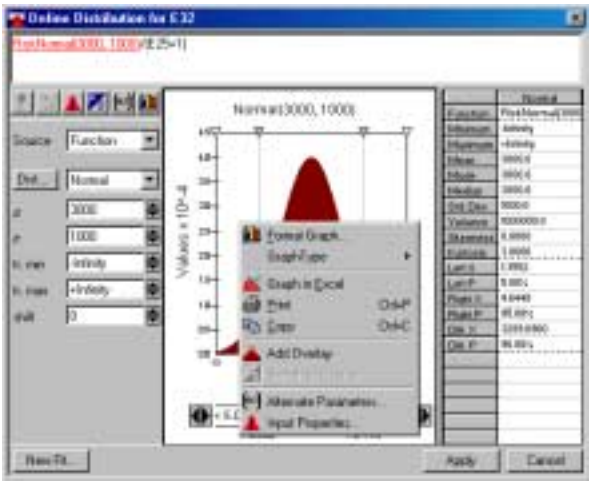
Enhanced Define Distribution Window

The pop-up Define Distribution window includes several new enhancements designed to make the graphical definition of probability distributions easier. These include:

- A new **Enter Excel Reference** icon allows the point and click selection of cell references for distribution arguments
- A pop-up **distribution pallete** (displayed when the **Dist..** button is clicked) makes the selection of a distribution type easier

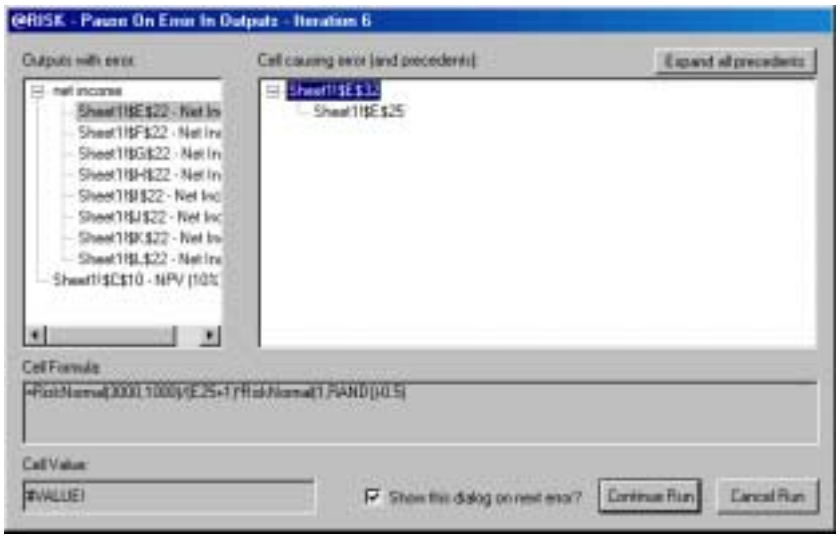


- A new **right-click menu** for easy selection of Define Distribution window options



Improved Error Reporting

The **Pause on Error in Outputs** option in the Simulation Settings dialog now provides a detailed listing of the outputs for which errors were generated during a simulation and the cells in your spreadsheet that caused the error.



When an error is generated for a simulation output in an iteration of a simulation, the Pause on Error in Outputs dialog shows each output for which an error was generated and the cell whose formula returned the error value. You can also review the formulas and values for cells which are precedents to the "error causing" cell, in order to examine values which feed into the problem formula.

Detailed Listing of New and Changed Features

Changes to the @RISK Add-In Interface

New @RISK Sub-Menus

The main @RISK menu in Excel contains two new sub-menus. The *Options* submenu contains three general program options described below: *Show Expanded Toolbar*, *Prompt for Output Names*, and *Display Cumulative Descending Percentiles*. The *Advanced Analyses* sub-menu contains three new analyses: *Goal Seek*, *Stress Analysis*, and *Advanced Sensitivity Analysis*, which are described in the next section.

Expanded and Collapsed Toolbars

@RISK 4.5's toolbar can be in two modes of operation. The "collapsed" mode displays all the same icons as @RISK 4.0's toolbar. The "expanded" mode displays advanced options available in the Professional and Industrial Edition of @RISK, including distribution fitting, goal seek, advanced sensitivity analysis, and stress analysis. You can switch between the two toolbar modes by clicking the last icon on the toolbar, or by selecting the *Show Expanded Toolbar* item in the *@RISK/Options* menu.

Prompting for Output Names

When you add an output using the *Add Output* icon, @RISK will now prompt you for an output name. You can turn this feature off and on by selecting the *Prompt for Output Names* item in the *@RISK/Options* menu.

Descending Percentiles Mode

@RISK now allows you to specify that reports and statistics use cumulative descending percentiles values instead of the default cumulative ascending percentiles. This option is accessed using the *Display Cumulative Descending Percentiles* item in the *@RISK/Options* menu.

@RISK "Splash Screen" Removed

For improved launching speed, @RISK no longer shows the @RISK "splash screen" when it launches.

New Advanced Analyses

The Professional and Industrial versions of @RISK 4.5 come with three new advanced analyses: *Goal Seek*, *Stress Analysis*, and *Advanced Sensitivity Analysis*. Each of these is described in detail in the new @RISK 4.5 multimedia tutorial.

Goal Seek

The @RISK Goal Seek is analogous to Excel's built in Goal Seek, but modified to take advantage of simulation. By running multiple simulations, @RISK's Goal Seek allows you to change a specific cell to reach a target goal for the output (such as a standard deviation of 1000, or a mean of a 5000.) To run this analysis, click the *Goal Seek* icon on the "expanded" @RISK toolbar, or choose the *Goal Seek* item from the *@RISK/Advanced Analyses* menu.

Stress Analysis

Stress analysis allows you to see the effects of "stressing" an input to an extreme range of its domain. For example, if you have a distribution for "Cost" in your simulation model, stress analysis would let you quickly see the effects of forcing the "Cost" distribution in the highest 90 percentile. You can start this analysis by clicking on the *Stress Analysis* icon on the "expanded" @RISK toolbar, or by choosing the *Stress Analysis* item from the *@RISK/Advanced Analyses* menu.

Advanced Sensitivity Analysis

Advanced sensitivity analysis allows you to see the impact of changing model parameters on the outputs of a simulation. This analysis creates a large number of statistics and graphs, including spider plots, box plots, and histograms that allow you to analyze the impact of your changing cells. You can start this analysis by clicking on the *Advanced Sensitivity Analysis* icon on the "expanded" @RISK toolbar, or by choosing the *Advanced Sensitivity Analysis* item from the *@RISK/Advanced Analyses* menu.

Changes in Simulation Options

Improved Pause on Error Option

The *Pause on Error in Outputs* option has been improved, and now allows you to scroll through your spreadsheet, so you can better identify and correct modeling errors. This option is available on the *Iterations* tab of the Simulation Settings Dialog.

New Multiple CPUs Option

A new option for users of the Industrial Edition of @RISK is available on the *Iterations* tab of the Simulation Settings Dialog. The *Use Multiple CPUs* option allows you to make use of all the CPUs on your multiple CPU machine when running an @RISK simulation. See the user's manual for more information.

Changes to Spreadsheet Functions

Alternate Distribution Parameters

You can now specify "alternate" distribution parameters for many kinds of distributions. For example, you can specify a normal distribution with a 5th percentile of 10 and a 95th percentile of 20 using the function RISKNormalAlt(5%, 10, 95%, 20). To specify alternate parameter distribution using cumulative descending percentiles, use the "AltD" function. For example, RISKNormalAltD(95%, 10, 5%, 20). See the @RISK manual for more information.

New RISKCumulD Distribution

The function RISKCumulD has been added so you can specify a customized distribution in terms of cumulative *descending* percentiles.

New RiskTargetD and RiskPercentileD Statistics Functions

These two new functions allow you to generate target and percentile values in terms of descending percentile values.

Changes to the Define Distribution Window

New Distribution Palette

The Define Distribution Window now contains a distribution palette for the quick selection of distributions. Access the palette by clicking the "Dist..." button. This palette also appears when adding an overlay to a graph.

New Select Excel Reference Icon

While you have always been able to type references directly into the Define Distribution Window, you now can click on Excel references directly, using the *Select Excel Reference* icon.

New Menu Options for Controlling Distribution Overlays

Several new menu items have been added to the right-click popup menu for adding, removing, and editing overlays. Simply right-click on a distribution's graph in the Define Distribution Window.

Improved Default Distribution Parameters

The Define Distribution Window now generates smart default parameters for your distributions when you add overlays or switch between different distribution types.

New Alternate Parameters

You can now specify "alternate" distribution parameters for many distributions using percentiles. For example, you can specify a normal distribution with a 5^{th} percentile of 10 and a 95^{th} percentile of 20. Click the *Alternate Parameters* icon to show the Alternate Parameters Dialog.

Changes in the @RISK-Model Window

Toolbar Changes

Two toolbar changes have been made to improve navigation in the @RISK-Model window. First, a new *Insert* toolbar is available for creating new windows and Fit Tabs. Second, the *Fitting* toolbar has been made context sensitive, and will only appear when the active tab is a Fit Tab.

Generating @RISK Functions from @RISK-Model Windows

You many now put @RISK distribution functions directly into Excel from an Artist, Distribution, or Fit Result window, using the *Write Function to Excel* command, which is available on the right-click menu for these windows. In addition, for an Artist Window, this command is available on the *Artist* toolbar, and the *Artist* menu.

Generating @RISK Distribution Windows from an Artist Window

When you choose the *Create Distribution* command from an Artist Window, you now get a distribution that only reflects the "marked" points of the Artist Window. To change the number of data points in the distribution you generate, change the number of markers.

Deleting of @RISK Input Functions

In @RISK 4.0, you were able to remove @RISK output functions from your spreadsheet using the *Model* menu's *Remove Functions* command. In @RISK 4.5, you may now also remove input function using the same command. This command is also available on the right-click context menu of the input and output explorer list.

Changes in the @RISK-Results Window

Improved Filter Dialog

The Filter Dialog, available under the *Results* menu, has been improved with a new grid for entering filters, and options for globally disabling and enabling filters.

New Automatic Bin Minimum and Maximum Options For Histograms

There are now two automatic histogram binning options. The default "auto" option uses the range of the data set to determine the histogram's minimum and maximum, regardless of the graph's x-axis scaling. The "auto (axis scale)" option forces the bins to be also within the range of displayed x-axis. This was the default binning options in @RISK 4.0.

Relative Frequency Histograms

You can create histograms that display relative frequency instead of density by selecting the *Relative Frequency* option in the *Histogram Options* section of Format Graph Dialog.

Errors Reported in Statistics Summary Window

Any errors encountered during a simulation are now summarized in the last column of the Summary Statistics Window. Previously, this information was available only in the Detailed Statistics Window.

New Quick Report Option for Outputs

A new option on the right-click context menu in the explorer list allows you to generate a "Quick Report" of an output. This quick report is placed in Excel, and is formatted to fit exactly on a single printable page.

New Graph Icon in Insert Toolbar

A new icon in the *Insert* toolbar for graphing the active selection in the explorer list has been added. This icon duplicates the same options available on the *Insert \ Graph* menu.

Changes in Excel Reports

New Excel-Based Quick Reports

Two new Excel-based "Quick Reports" are available, which are formatted for printing. You can select to generate these reports in the Report Options Dialog, or by right clicking on an @RISK output in the @RISK-Results Window and choosing the *Quick Report* command.

Cell Formatting in Output Reports

Excel reports now mimic the formatting you have applied to output cells when displaying statistics and data for those outputs.

Changes to Tutorial, Documentation and Help Systems

Improved On-line Manual with Navigational Bookmarks

The @RISK 4.5 on-line manual has been improved with a set of navigational bookmarks.

New Probability Distribution Function Documentation

The probability distribution help file PDF.HLP (which was located in the \DTOOLS\SYSTEM directory) has been replaced with the file DISTFUNC.PDF, which is now in Adobe PDF format. You must have a copy of Adobe Acrobat Reader, which is available for free at www.adobe.com, to view this file.

New Macro Documentation

All information relating to the control of @RISK using VBA macros has been moved to the files RISKMACRO.CHM (in HTML-Help format) and RISKMACRO.PDF (in Adobe PDF format), which are located in your \DTOOLS\RISK45 directory. This information is no longer available in the printed documentation.

New @RISK 4.5 Tutorial

The @RISK 4.5 tutorial been updated to demonstrate the significant new features of @RISK. The new tutorial is in Window's Media Viewer (.wmv) format. You can start the tutorial by choosing the *Programs/Palisade DecisionTools/Tutorials/The @RISK 4.5 Tutorial* item in Window's "Start" menu.

Changes in Product Authorization

Auto-Authorize

If you are connected to the Internet, @RISK 4.5 can be automatically authorized. When the authorization dialog appears when you first launch @RISK, choose the *Authorize Now* button, and then select the *Automatic* option.